



EPA Region 7 TMDL Review

TMDL ID	296	Water Body ID	3246 - main stem
Water Body Name	Elk River		
Pollutant	Nutrients		
Tributary	Big Sugar Ck (3250), Buffalo Ck (3269 & 3273), Indian Ck (3256), L. Sugar Ck (3249), M. Indian Ck (3262 & 3263), N Indian Ck (3260), Patterson Ck (3268), S. Indian Ck (3259)		
State	MO	HUC	11070208
Basin	Elk River Basin		
Submittal Date	2/2/2004		
Approved	yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

Letter to EPA dated January 30, 2004 and received by EPA on February 2, formally submitting this TMDL for approval under section 303(d) of the Clean Water Act. EPA received a revision via e-mail on March 2, 2004 and a second revision on March 17, 2004.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The impairment of the Elk River is based on exceedence of the general criteria contained in Missouri's WQS which state: Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;" and "Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses. Phase 1 of this TMDL used historical records to establish a loading capacity numeric target expressed as a percentage reduction in load for

phosphorus and nitrogen. Phase 1 monitoring will provide a basis for adaptive management decisions on whether the phase one targets are adequate to meet the WQSs. Allocations for total nitrogen (TN) and total phosphorus (TP), through Phase 2 revisions, would ultimately result in WQS attainment.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Applicable WQS, beneficial uses and applicable narrative criteria are fully described. The Phase 1 target goal of this TMDL is to reduce the in-stream TP and TN to levels prior to 1985. The TMDL states "The Elk River Basin has experienced a marked increase in poultry production that accounts for a large measure of the surge in nutrient loading to the Elk River over the past two decades." National Agricultural Statistical Service data was cited to support the claim of an increase in production.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The State (and EPA) have not yet determined the appropriate numeric criteria for nutrients and there has yet to be determined a precise predictive relationship between TP, TN and chl-a biomass in lotic waters. TP and TN targets were identified using historical data from the Elk River during a period that the state believes was not experiencing impairment and through analysis of the existing nitrogen to phosphorus ratios compared to historic conditions. The mean levels of 136 USGS samples collected prior to 1985 was 0.0638 mg/L which was rounded down to 0.06 mg/L. The use of the mean values for the Phase 1 target is subject to some interpretation since the data set may not be normally distributed; however, the TMDL MOS is quite significant and should provide for sufficient load reductions necessary to achieve pre 1985 nutrient levels. Subsequent regression analysis by EPA accounting for trends, seasonality, and flow relationships support the percent reduction TMDL allocations regardless of the instream concentration value chosen for the pre-1985 conditions.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

The TMDL describes and lists the land uses, nonpoint, and point sources in the watershed. The TMDL also provides an extensive description of the hydrologic and geological characteristics of the watershed, as well as information on soil runoff and erosion potential, and source tributaries. Information on the non-point source (NPS)

contribution to the nutrient impairment is well defined including descriptions of various classes of NPS pollution contributing to the impairment. These classes included failing on-site septic systems, land application of commercial fertilizers, manure and poultry litter, grazing animals, wildlife, urban development, and recreation use.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The loading capacity for Phase 1 of this TMDL is based upon current knowledge of the relationships between nutrient loading, algae production, and historical trends. The capacity is expressed as a percentage reduction within each of five flow categories and was established from the 95th percentile of the observed data in each category compared to the load duration curve. The waste load allocation (WLA) for both TN and TP is based on the design flows of the wastewater facilities in the watershed and the desired condition for existing or impending TP and TN permit limits for those dischargers. The load allocation (LA) is based upon that capacity remaining after taking into account the point sources. As further information is gained through monitoring efforts during Phase 1, the WLA and LA may be revised for Phase 2 of this TMDL.

WLA Comment

The existing load from points sources is 630 pounds per day at the points of discharge which is expressed as an in-stream load in the Elk River measure at Tiff City of up to 228 pounds per day (95th percentile of samples) during baseflow conditions. A WLA expressed as a 64 percent reduction in load is necessary to meet WQS for TP at baseflow. Baseflow conditions occur in the flow probability range of 60 to 100 % on the Load Duration curve and the effects of the point sources are expected to dominant this flow regime. TN load reductions of 42% are assigned to the baseflow conditions. Individual wasteload allocations are established for all NPDES facilities in Missouri and the loading from Arkansas NPDES permits were accounted for in the calculations based on current permits and planning in Arkansas. The Bentonville permit has been reissued. The Tyson's facility is operating under an expired permit; by this TMDL, the WLA for Tyson is set at a maximum daily load of 29.163 pounds per day of total phosphorus and 25.5 mg/L maximum daily concentration of total nitrogen. Total nitrogen is the sum of total Kjeldahl nitrogen plus nitrate plus nitrate nitrogen (NO₂+NO₃ as N.)

LA Comment

NPS contributions tend to become dominant under runoff as opposed to the baseflow described in the WLA discussion. Tables for both TP and TN were included in the TMDL which categorize the NPS percentage reductions required during various flow conditions. By way of example, a 75 percent reduction in TP load is required during the highest flow category. NPS controls must be relied upon to achieve almost all of this reduction.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

An implicit MOS is identified as the use of the 95th percentile of the observed data within each flow range instead of the mean or median of the measurements. An explicit MOS is also claimed by targeting a load reduction for the larger facilities at 10% below the TMDL during baseflow conditions.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation is discussed in light of the characteristics of the attached algae and also in the sense that by establishing the TMDL as a load duration curve, all seasonal flow conditions are reflected in the targets.

Public Participation

Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Monthly public meeting regarding the water quality issues in the Elk River watershed have been held since April, 2003. The draft TMDL document was placed on public notice for December 5, 2003 through January 4, 2004. The state of Missouri considered the comments received during the comment period and in some cases adjusted the TMDL language to account for comments received. Missouri prepared and sent responses to the commentors.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

A rigorous monitoring plan consisting of 25 monitoring stations, will help clarify the relationships between nutrient loadings, suspended sediment, streamflow, and algae production. Missouri plans to use the information in future modeling particularly in support of implementation and future concentration targets.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

For the baseflow conditions, there is no reasonable assurance requirement because the reduction targets from the point sources will achieve the WQS without relying on additional NPS reductions. For other flow regimes, the document describes extensive NPS activities and funding sources which, in conjunction with the WLA, will achieve the WQS. By way of example, the McDonald County Soil and Water Conservation District received \$645,763 out of an anticipated \$1,258,596 total grant to work on Comprehensive Nutrient Management

Plans and implement construction to prevent phosphorus runoff. Other 319 grants have been awarded in the watershed to work on BMPs and a composting demonstration project. Many other activities are discussed in the TMDL.
